USER DOCUMENTATION

MODEL A

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1. INTRODUCTION

Thank you for selecting a Model A microphone.

The Simpson Model A is the first microphone to apply the principle of acoustic impedance-matching to the problem of mechanical nonlinearity in the microphone.

It is also the first microphone to apply novel psychoacoustic principles of spectral masking precedence to achieve the perception of depth.

With mechanical distortion levels far below other available microphones and ideal critical spectral masking behaviour, you will find the Model A to be unlike other microphones in performance & use.

2. OVERVIEW

The Simpson Model A is a new and unique concept in microphone design.

Unlike conventional microphone design, the Model A microphone actively pursues mechanical accuracy in the time domain rather than frequency domain accuracy, in the knowledge that time domain accuracy is the only acceptable path to the derivative (frequency domain accuracy).

This is the key concept behind the Model A.

3. CALIBRATION

Since the Model A has been designed with mechanical linearity performance as first priority, it has an inherently unequal (predictable) frequency response. This means that the output of the microphone must be post-calibrated.

During the design of this microphone, it was decided that for reasons of quality and modular upgrade & context flexibility, that post-equalisation would not be included in the microphone circuitry itself but made in the post signal chain by the user.

This ensures that the analogue signal path from capsule to pre-amplifier input is extremely minimal, ensuring the least electronic losses in resolution.

Calibration using the supplied mastering quality linear-phase equalisation software is a relatively simple matter and is covered in depth during delivery/training. The supplied software offers totally ideal state-of-the-art linear-phase performance.

3.1 *Training / delivery*

Usually one complete working day is provided for the delivery/calibration/training stage, though in special circumstances this period can be extended by arrangement.

During this time we will cover a number of key application calibrations so that the user is familiar with the basic use and can move on to advanced use.

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Also during this time we can cover blind-test calibration procedure - should the user be interested in direct comparison with the source.

Please email/ring for details of blind-testing procedure & calibration giving full details of monitors, room, source, etc.

4. IN USE

4.1 *What to expect from the Model A in recording situations*

The Model A microphone is unique in microphone design in that it achieves massively improved mechanical linearity & spectral balance performance.

This behaviour manifests itself in several ways:

- *more natural timbre*
- *greater general & spatial resolution*
- *more controlled & natural dynamic range*
- *greatly reduced impression of 'mechanical stress' / compression*

These features are most readily recognisable in recording situations where extreme mechanical demands are placed on the microphone.

Sound sources such as orchestra, violin, percussion, human voice, both electric & acoustic guitar, etc all place the microphone diaphragm under considerable mechanical stress. In particular, constant excitation sources such as violin or voice easily set the Model A apart from other microphones.

4.2 *Critical spectral masking - Depth*

The unique Model A polar pattern was designed to maintain the ideal spectral relationship, which is critical to maintaining the spectral masking balance, which psychoacoustic principle is fundamental to the perception of depth.

This spectral masking behaviour, combined with the massively reduced distortion means that the Model A is capable of resolving more complex acoustic sources with greater clarity & natural balance.

This is evident in highly reverberant recording spaces such as gothic churches or orchestral halls, where the self-masking relationships of the reverb itself is captured in the most natural way possible.

The higher level of spatial & timbre definition in such situations cannot be achieved with conventional microphones and is maintained at any distance from the source.

4.3 *Headroom considerations*

Since the Model A can produce surprisingly dynamic output, greater attention to pre-amplifier & other signal chain headroom must be paid.

This is not least because of the fact that most 'overdrive'/'clip' warning lights operate on current and are therefore more sensitive to low-frequencies than mid-range or high frequencies.
Also, RMS meters will react less vigorously because of the prominence of the pre-equalised mid-range frequencies (where peaks are high but current average appears low).

Due to the potential for high levels of equalisation, headroom must also be carefully observed within equaliser gain stages (software or hardware).

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4.4 *Pre-Amplifier Considerations*

As a moving-coil microphone (transformer output), the Model A works best when used with microphone pre-amplifiers with appropriate input impedance (loading characteristics).

If you do not plan to use the Model A with the supplied pre-amplifiers please email/ring to discuss pricing options & specifications.

Normal pre-amplifiers with input impedance between 600-20,000 ohm are suitable.

However, very high impedance pre-amplifiers (>30kohm) are unsuitable as they do not provide adequate electrical impedance for the microphone.

If your chosen pre-amplifier has variable input impedance settings, please use an input impedance nearest to that specified above.

5. SUGGESTED CALIBRATION & QC SERVICE

One of the most significant strengths of the Model A is time-domain accuracy, which leads to complete frequency domain compliancy – where equalisation can be liberally applied without sonic penalty.

For calibration, a single post-equalisation 'curve' is applied to the output from the Model A.

However, depending on variable acoustic environmental conditions such as diffuse-field or free-field, microphone amplifier & electrical variables, & subjective preferences, differing equalisation can be appropriate.

During the delivery/training period calibration of the Model A will be covered in depth. During this time we can also cover specific calibration for various pre-amplifiers/converters/etc.

All Model A users have available a lifetime QC (quality check) service which includes calibration assistance.

Should a user require remote assistance in calibration of a recording he can upload an un-calibrated sample to our server which will be calibrated correctly & returned with calibration settings. In this way the user can also specify custom requirements and build a library of specific calibration settings for various uses.

The QC service is offered over the lifetime of the user and is reasonably extended to whoever should use the microphone in question.

In any case, the user should feel totally confident to adjust equalisation to taste without sonic penalty.

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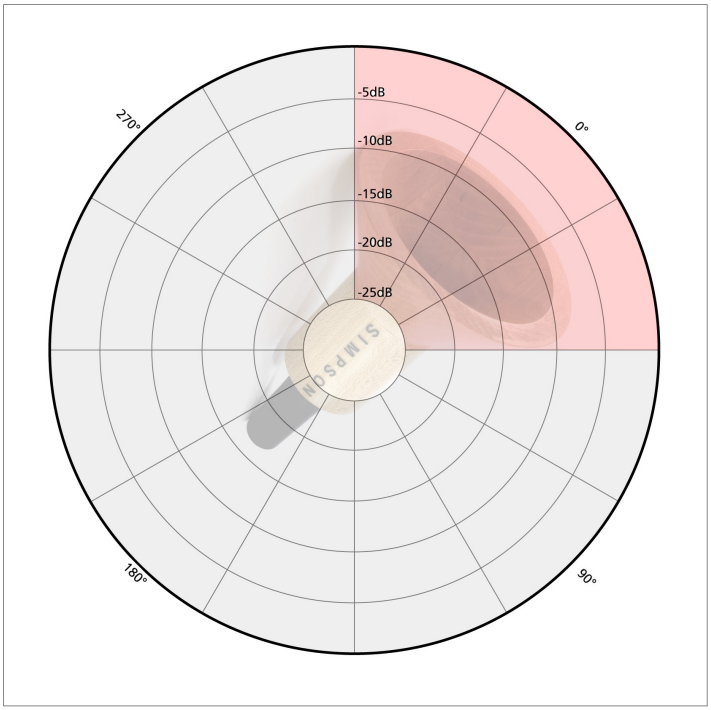
6. POLAR PATTERN & RESPONSE CHARACTERISTICS

The polar pattern of the Model A is generally fairly intuitive and can be easily understood by looking at the microphone.

Above the range where the geometry of the microphone is acoustically-active (>~1kHz), this basically constitutes a cardioid pattern but is obviously more defined than a normal cardioid pattern.



Below this range the Model A is omni-directional.

Since the cardioid response of the Model A is achieved not by acoustic delay (as in traditional microphone design) but by acoustic geometry, the extremes of the polar response are predictable & linear (unlike traditional cardioid microphones).

This polar pattern is designed according to our psychoacoustic research, which in combination with the unique mechanical linearity performance of the Model A, results in uniquely effective gains in sound quality.

Specifically, the Model A is the first microphone to be designed to record with ***depth*** – which is noticeable in both direct & indirect sound.

Dynamic response

The dynamic response characteristics of the Model A are somewhat different to normal direct-coupled microphones.

Due to the reduction in nonlinear distortion (compression), a greater & more controlled dynamic range is recorded.

Also the related presence of non-harmonic distortion products is greatly reduced, which effectively improves musicality and leads to a broader spectrum of potential tonality.

In combination, this further facilitates greater transparency in all types of post-processing, including dynamic/time-based processing (ie. compression/reverb/etc will be more transparent).

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7. POTENTIAL APPLICATIONS

The Model A has been designed to work in an practically unlimited field of application.

It is an extremely robust microphone with respect to source sound pressure levels and is well suited to close proximity use on loud sources such as drums, guitar amplifiers, brass instruments, etc.

In fact, due to the low distortion behaviour, the Model A is uniquely suited to these roles where other microphones become nonlinear under extreme acoustic-mechanical stress.

The Model A is also uniquely effective in recording at distance and achieves unmatched clarity & dynamics in acoustic orchestral or location settings.

8. STEREO & SURROUND USAGE

As matched pairs & matched sets are available (for Stereo & Surround respectively) the Model A makes an excellent choice for multi-channel recording.

The microphone can be used in a stereo pair in several ways.

Firstly, the microphone can be used as a coincident pair where level differences constitute the entire stereo effect.

Secondly, the microphone can be used in spaced pair or spaced array formats (eg. decca-tree) where time & level differences constitute the stereo effect.

In both cases, angles, spacing & orientation are the critical factors. However, the user will likely find that stereo placement is intuitive because the shape of the microphone serves as a solid visual guide to pickup pattern in 3-dimensions.

As a general rule, when looking from the location of the source instrument, if the player has a sight-line to the 'dark eye' of the microphone, the instrument will be picked up cleanly.

In Surround Sound, a matched set (5-piece) can be used in the standard outward facing cardioid arrangement with front facing L/C/R & rear facing L/R. In fact, the rigid pickup pattern of the Model A lends particularly well to this technique.

See following placement examples.

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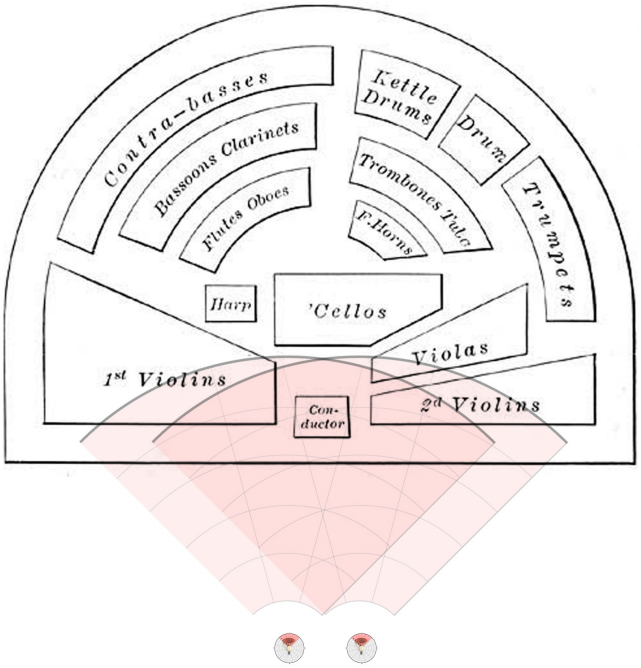
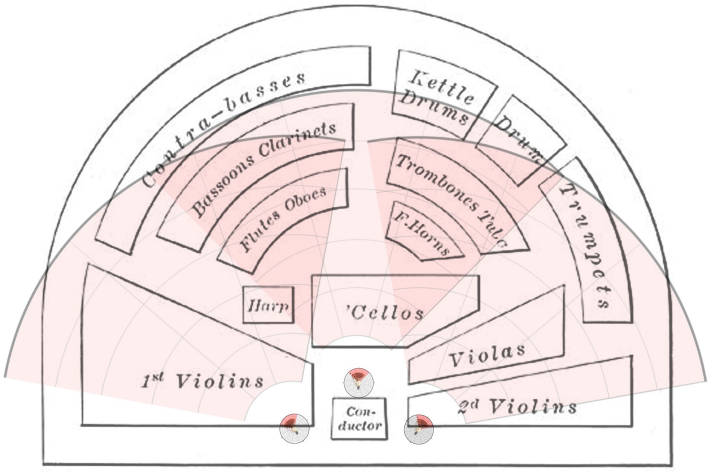
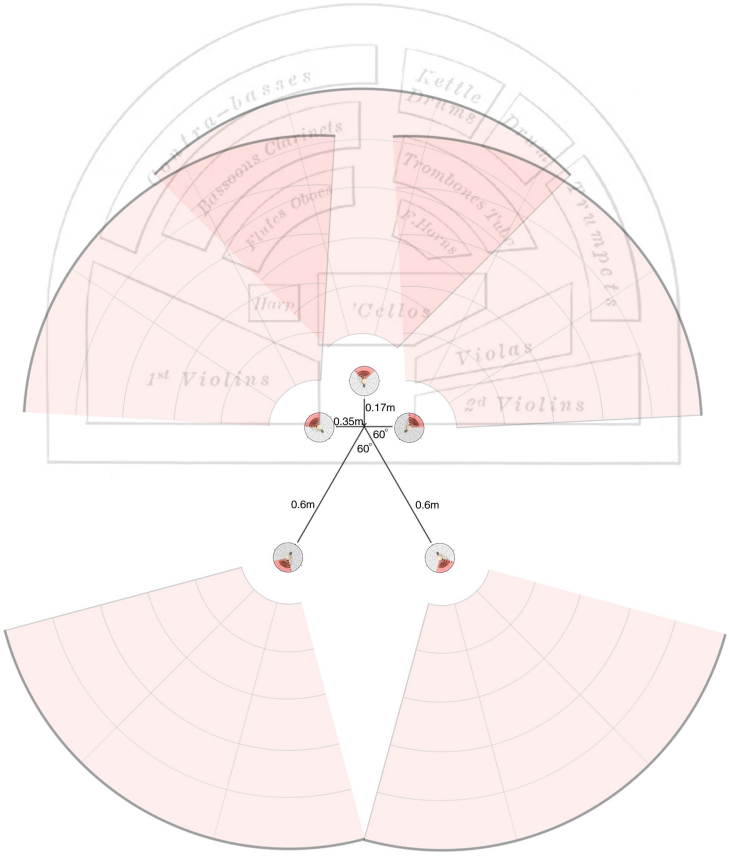
8.2 *Typical microphone placement examples*



Above - typical stereo pair configuration for orchestra, below – typical decca-tree configuration for orchestra





Above - typical 5 channel surround configuration for orchestra

Notes

Given the scale of the orchestra, placement of the orchestra and sound balance required, variation of angles, distances & height are critical.

Further, it should be noted that where 2-dimension polar patterns are indicated, these patterns are exactly indicative of 3-dimensional behaviour, so pickup depends greatly on height & angle

Decca-tree (A/B comparison with conventional microphone) audio examples here: http://www.simpsonmicrophonesarchives.com/AB/

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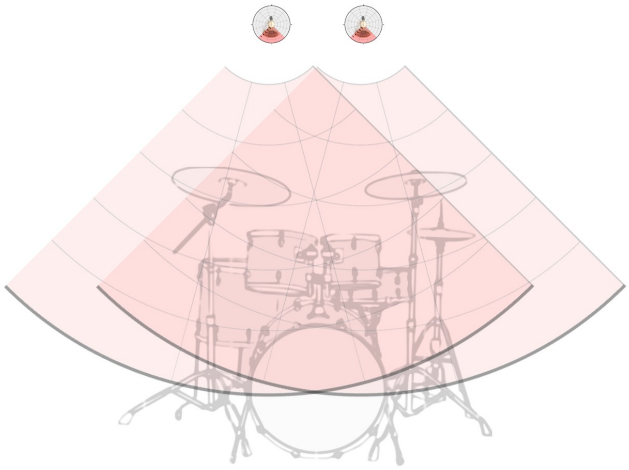

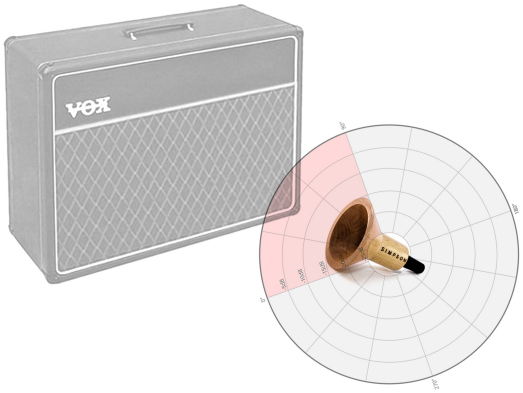

Above - typical drum overhead configuration, below – typical electric guitar cabinet use

Notes

In the case of drum recording, the relative distance (depth) relationship between the various components of the kit can be effectively managed by placement of the microphones.

Where 'over-head' placement is used, physical distance from each component will contribute directly to the perception of depth-placement.

For example, where snare-drum/bass-drum requires prominent feature, placing the microphones lower and further to the rear of the drum-kit will be effective.

In the case of guitar amplifier cabinet recording, since many cone-type loudspeakers exhibit extreme directionality with rising frequency, angle of placement dictates response.

Notes on achieving depth in recording

Given that the perception of depth is a function of auditory masking, both intensity (loudness) and spectral shape dictate the result.

The Model A is designed specifically to offer unique facility in deliberately recording with specific depth perspectives in mind.

In the case of orchestral recording, the perception of depth depends on the perspective of the scene.

For example, if the microphones are placed centrally above the orchestra, with all instruments equidistant from the microphones, we can expect less perception of depth between the instruments.

In the case of the typical decca-tree format, since the microphones are located near the front of the orchestra, with increasing distance of instruments towards the rear, the perception of depth will be similar to that perceived by the audience or conductor.

In order to vary the perspective, different height placements can be used.

For example, in the case of very low placement, depth will be extreme – near instruments will have strong presence and further instruments will appear further placed.

Alternately, in the case of very high placement, the depth perception will tend toward a more equal balance.

In all cases, the perception of depth & perspective is a question of subjective preference and because of the unique properties of the Model A, clarity will be maintained whatever the perspective (even from great distances).

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9. NOTE FROM THE DESIGNER

When I first entered microphone design, I was concerned with several factors I deemed to constitute 'good sound quality'.

In particular I looked for: low resonance, natural dynamics, musical coherency, depth, clarity and 'size of sound'. I also looked for a microphone that delivered recordings which were perfectly scaleable.

These things I first looked for in ribbon microphone design but having pushed the technology as far as it would go I remained unsatisfied.

It was possible to achieve a relatively natural sound with a massive bandwidth but the resolution and dynamics of real life were lacking.

After extensive research it became apparent that this was the sound of 'mechanical stress' – nonlinearity, the product of the mechanical limitations of conventional direct-radiator microphones.

In designing the Model A from the perspective of mechanical & psychoacoustic performance a radical new design approach quickly evolved to answer questions which arose from taking the new perspective.

It has been a very long road from conception to market and there will undoubtedly be significant controversy surrounding the technology of the Model A, not least because it goes against conventional microphone design.

I am well aware that this microphone requires a certain leap of faith, as it is quite a leap from current microphone technology & thinking. Also, realisation of this concept has only recently become conceivable due to advances in digital technology (specifically digital equalisation).

When I first came to field test the microphone even I was sceptical of the reality of its use and wary to trust it for serious work. Putting such trust in equalisation was a hard psychological barrier to overcome, despite the supporting theory.

However, after a very short time I came to trust the microphone exclusively as a working tool and abandoned any safety nets of auxiliary microphones on recording sessions. In fact, quite soon I came to feel unusually liberated and able to be concerned with the sound of the source, rather than of the signal chain.

I sincerely hope you have a similar experience with the Model A and I wish you the best of luck with your recordings.

Andrew Simpson

Simpson High Resolution Microphones, Poland

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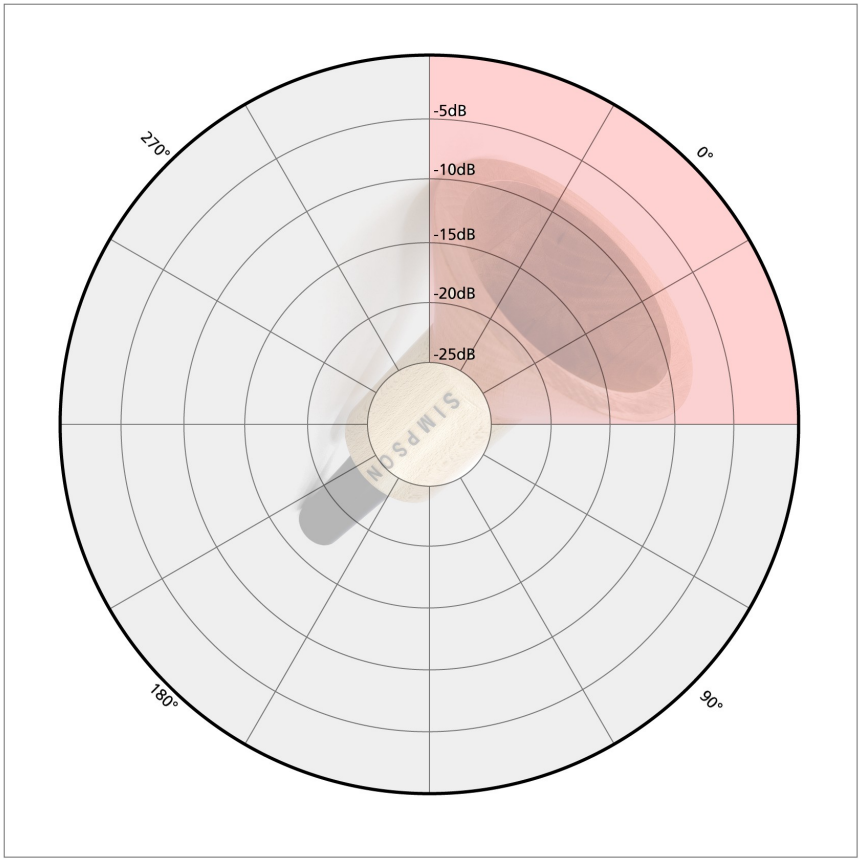
TECHNICAL SPECIFICATIONS

TYPE:	**Acoustic impedance-matching moving-coil**
PICKUP PATTERN:	**Cardioid / hyper-cardioid** ***Symmetrical***
SENSITIVITY *(@2kHz)*:	**-40dBV/Pa**
FREQUENCY RESPONSE:	**20Hz-20kHz nominal *(calibrated)***
OUTPUT IMPEDANCE:	**~200ohms nominal**
DISTORTION *(DFD, @2kHz):*	**<0.0002% @90dB SPL** **<0.001% @105dB SPL** **<0.02% @130dB SPL** **<1% @165dB SPL**



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USER WARRANTY

This microphone is warranted against mechanical failure for 25 years from the date of purchase.

*In the extremely unlikely event of a failure, please return the microphone to us and we will fix it as quickly as possible. * The user will cover shipping costs*

If the damage/fault was not caused by user error, there will be no charge. Otherwise parts will be charged at cost.

In the unlikely event of any problem with the microphone, please don't hesitate to email or call and we will be happy to help in any way we can.

Email: service@simpsonmicrophones.com

Telephone: 0048 787 317 206

Or check the website for updates & details

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